NEWFOUNDLAND REGION GROUNDFISH OVERVIEW

Background

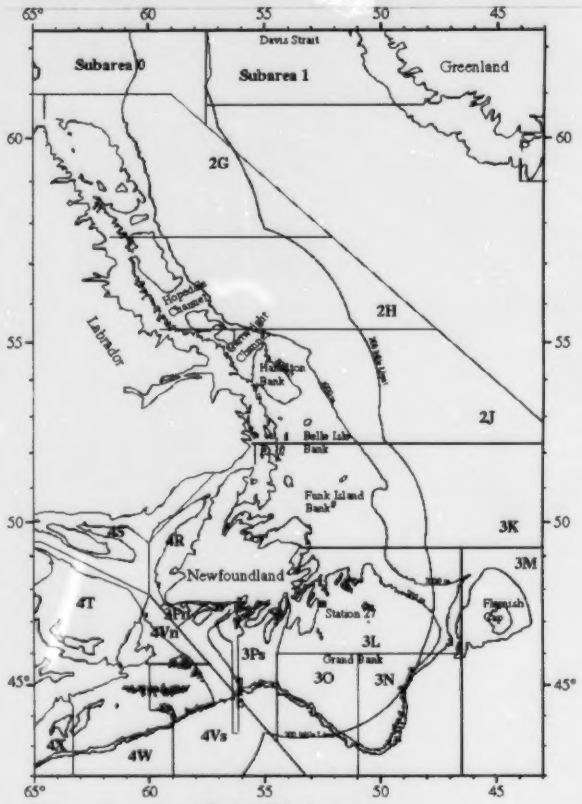
In Newfoundland, Science, Oceans and Environment Branch of the Department of Fisheries and Oceans is responsible, either directly or indirectly, for advising on the status of numerous groundfish stocks located from Davis Strait in the north to the south coast of Newfoundland in the south.

In this area, there are 5 cod stocks (2GH, 2J3KL, 3M, 3NO and 3Ps), 5 redfish stocks (SA2+3K, 3LN, 3M, 3O and Unit 2), 4 American plaice stocks (SA2+3K, 3LNO, 3M and 3Ps), 3 witch flounder stocks (2J3KL, 3NO and 3Ps), 2 Greenland halibut management areas (SA0+1 and SA2+3KLMNO), 2 haddock stocks (3LNO and 3Ps), 1 yellowtail flounder stock (3LNO), 1 pollock stock (3Ps), 2 roundnose grenadier stocks (SA0+1 and SA2+3), thorny skate, white hake and monkfish in 3LNO as well as a portion of the 3NOPs4VWX Atlantic halibut stock. In addition, there are coastal fisheries for lumpfish, and winter flounder.

Scientific information on the above stocks is provided either through the DFO Science, Oceans and Environment Branch regional review process and the FRCC, or the Scientific Council of NAFO. Quotas are set by the NAFO Fisheries Commission for 3NO and 3M cod, 3LN and 3M redfish, 3LNO and 3M American plaice, 3LNO yellowtail flounder, 3NO witch flounder, 2+3 grenadier and SA2+3KLMNO Greenland halibut. The NAFO Scientific Council also reviews the Canadian assessment of 2J3KL cod and 2J3KL witch flounder on an annual basis. Greenland halibut, and roundnose grenadier in SA0+1 are managed bilaterally by Denmark, on behalf of Greenland, and Canada. Quotas for the other stocks are set by the Minister of the Department of Fisheries and Oceans based on recommendations of the FRCC.

The Newfoundland Region Stock Status Reports contain information pertaining only to those stocks for which the FRCC directly provides catch recommendations to the Minister. Information on the stocks evaluated and managed by NAFO is contained in separate documentation; the reports of the NAFO Scientific Council.

Detailed technical information on each of the stock assessments can be found in the research documents listed with each stock report. Technical information for the NAFO stocks is available through the NAFO SCR Document series. ***This overview includes updates for stocks not formally assessed in 1999.***



The Groundfish Fisheries

Cod traditionally dominated groundfish catches in Newfoundland waters, but with the decline of this resource in the late 1980's and early 1990's, other species have become a more significant proportion of the catch. As well, reductions in catches of a number of different species and stocks have occurred since 1994 as a result of reduced fishing effort in the NAFO Regulatory Area (NRA). In 1995 and 1996, groundfish catches were dominated by Greenland halibut and redfish. In 1997 and 1998, gadoids, particularly 3Ps cod, once again became an increasingly greater proportion of the overall groundfish catch.

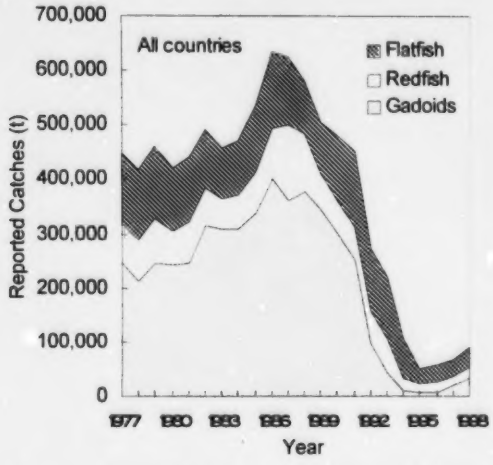


Figure 1- Groundfish catches for all stocks managed by the Newfoundland Region, 1997-1998

In 1994-1996, the only directed 'traditional' species fisheries were for Greenland halibut in SA0+1 and SA2+3KLMNO; cod in 3M; redfish in 3LN, 3M, 3O and Unit 2; and witch flounder in 3Ps. In 1997, following a three-year moratorium, the fishery for cod in 3Ps was re-opened with a 10,000 metric tonne TAC. The TAC was raised to 20,000 metric tonnes in 1998, and 30,000 metric tonnes for 1999. Nineteen ninety-eight also marked the re-opening of a fishery for yellowtail flounder in divisions 3LNO (4,000 metric tonne TAC). This fishery continued in 1999 with a TAC of 6,000 metric tonnes. A limited fishery for cod in 2J3KL (9,000 metric tonne TAC) was also re-introduced in 1999.

Canadian fisheries for 'non-traditional' species such as lumpfish, monkfish, wolffish, white hake, winter (blackback) flounder and skates continued in 1998 and 1999.

There were catches of 847 and 1,113 metric tonnes of witch flounder taken from the 2J3KL stock in the NRA by international fleets in 1997 and 1998 although the fishery on this resource was closed to Canadians based on recommendations of the FRCC. A moratorium on fishing this stock in the NAFO Regulatory Area was imposed by the Fisheries Commission of NAFO in 1998, and continued for 1999 and 2000.

Directed fishing for redfish in 3LN was not permitted for 1998 or 1999 due to a closure imposed by the Fisheries Commission of NAFO.

Background to Groundfish Reviews

This overview provides an update on the status of **2GH cod, 3LNO** and **3Ps haddock, SA2+3K redfish, American plaice in SA2+3K, thorny skate, white hake, monkfish, winter (blackback) flounder lumpfish,** and **wolfish (catfish),** the latter taken as bycatch only. These stocks were not formally assessed in 1999 but their status has been updated by the responsible assessment scientists.

Cod in Division 2J3KL (SSR A2-01) was assessed during a zonal assessment meeting in spring 1999. **Cod in Subdivision 3Ps** (SSR A2-02) was assessed zonally during spring of 1999, and regionally in the fall of 1999. **American Plaice** and **witch flounder in Subdivision 3Ps** (SSR's A2-12 and A2-09) were also assessed regionally in the fall of 1999.

Unit 2 redfish and Div. 3O redfish will be reviewed in detail during a zonal meeting scheduled for the fall of 1999. Stock Status Reports for these stocks will be available following the assessments.

Information on the status of stocks assessed by NAFO, as well as the 1999 advice of Scientific Council, is available in the **report of the June 1999 meeting (NAFO SCS Doc. 99/21).**

Offshore Research Surveys

As elaborated in past Overview documents (Anon., 1996; Anon., 1997 Anon., 1998), the Newfoundland Region has changed to using the Campelen 1800 shrimp trawl with 'rock-hopper' foot gear for its research surveys. This gear provides better information on young fish as well as other species such as crab and shrimp.

Different fishing gears catch different sizes and quantities of fish species. Therefore, before being able to relate catches from surveys using the new survey trawl to those made in the past using the previous survey trawl (Engel), it was necessary to conduct **comparative fishing experiments**. These experiments were described in some detail in the 1996 Overview (Anon. 1996). Conversion factors are available for the 'traditional' species. Data conversion has been completed for some stocks/species but is ongoing for others. For the most part, conversions have not been completed for species not undergoing full reviews in 1999 and presented here. It is not possible to develop conversion factors for 'non-traditional' species at this time.

Groundfish Resource Status

Most **'traditional' groundfish resources** in the waters around Newfoundland continue to be at, or very near historical low levels. For many **Canadian managed stocks** with TAC's still in place (2J3KL and 3Ps cod, Division 3O and Unit 2 redfish, 3Ps witch, 3LNOPs4VWX halibut and 3LNO thorny skate) reduced TAC's were imposed for 1995, and further reductions occurred for 1996, 1997 and 1998 (except cod).

There are several notable exceptions. As previously noted, a fishery for 3Ps cod was re-opened in 1997, the TAC for 3Ps witch flounder was increased from 500 in 1997 to 650 metric tonnes in 1998 and again in 1999. The Unit 2 redfish quota was increased from 10,000 metric tonnes in 1997 to 11,000 metric tonnes for 1998 and to 12,000 metric tonnes in 1999. The Division 3O redfish quota has remained at 10,000 metric tonnes from 1994 to 1999.

For the **NAFO-managed groundfish stocks**, directed fisheries were permitted for yellowtail flounder in 3LNO, cod in 3M in 1998 and again in 1999. Fisheries for Greenland halibut in SA0+1 and SA2+3KLMNO continued through the 1990's without interruption.

Divisions 2GH Cod

As for most cod stocks in the Northwest Atlantic, 2GH cod experienced a large increase in catch by non-Canadian fleets from the mid 1960's to early 1970's peaking at 94,000 metric tons in 1966. Non-Canadian catch was the largest component until 1986.

Canadian catches averaged only 480 tons annually from 1960 to 1990 with a maximum catch of 3,200 metric tonnes in 1982.

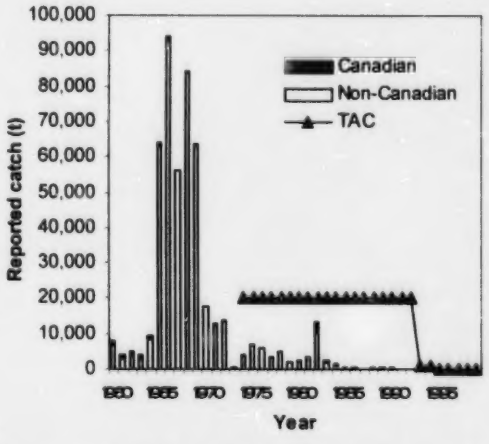


Figure 2 – Reported catch and TAC for Divisions 2GH cod, 1960-1998.

No directed fishing has been permitted on this stock since 1996 and there has been no reported catch since 1991.

Since 1996, Canada has carried out a multi-species survey of Divisions 2GH to 1500 meters. This survey has had varying coverage because of lost time. As well, coverage and timing are probably more appropriate for Greenland halibut than for cod. The question of cod being inshore of the surveyed area at the time of the survey still remains. Without an appropriately timed survey covering the entire area, it will remain unknown if concentrations of cod exist shoreward of the 200-meter contour. **Nonetheless, for areas covered, no significant concentrations of cod were found in the 1996-1998 surveys and it appears that the stock remains at a very low level compared to earlier periods.**

Divisions 3LNO Haddock

Management advice has specified no directed fishing and limited by-catch since 1993 for this stock. The closure on directed fishing remains in place for 1999. Reported **catch** for 1998 was 73 metric tons, most taken in 3O. Catch to October 1999 was only 47 metric tons.

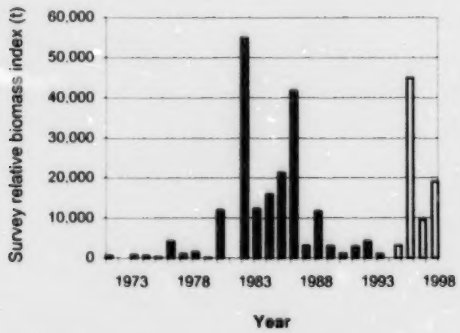


Figure 3 – Spring research survey biomass index for Divisions 3LNO Haddock, 1973-1998. Dark bars represent years done with Engels gear, white bars with Campelen.

Low catches in recent years are due to the moratoria on cod and flatfish stocks in 3LNO as well as a reduction in by-catch limits for haddock.

In 1994 and 1995, the **spring research survey index** was low with estimates similar to those of the 1970's. The survey index increased sharply in 1997 then decreased in 1998. The sudden increase was due to one large catch of pre-spawning fish (97% of the abundance and 98% of the biomass). The spring 1998 survey located fewer haddock.

No juvenile haddock were caught during the spring 1997 survey. **The pelagic juvenile survey,** conducted annually since 1992, found young of the year haddock for the first time in 1998. After settling, this year class was also evident in significant numbers in the autumn 1998 survey and was again seen in significant numbers in the 1999 spring survey. The significance of this pulse of recruitment is not yet known, but current evidence suggests that the 1998 year-class may be strong. If the current moratorium on plaice and cod remains in place and mesh size regulations in the yellowtail flounder fishery are adhered to, fishing pressure on the 1998 year-class should be low.

Subdivision 3Ps Haddock

Since 1960, **catches** of haddock in 3Ps have generally been in the 1,000 to 2,000 metric tonne range, increasing to 7,500 metric tonnes in 1985 then falling below 1,000 metric tonnes after 1990. In recent years, there has been no directed fishing. However, bycatch restrictions have been in place. For 1999, there is again no directed fishery allowed. Reported **by-catches** for the 10,000-ton cod fishery in 1997 and 20,000-ton fishery in 1998 were only 75 and 222 metric tonnes respectively. By-catch to October 1999 is only 27 metric tonnes.

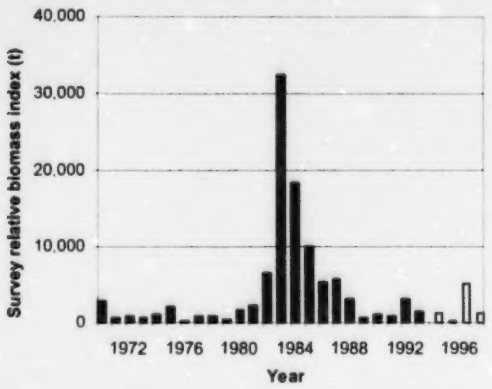


Figure 4 – Spring research survey biomass index for Subdivision 3Ps Haddock, 1972-1998. Dark bars represent years done with Engels gear, white bars with Campelen.

The index of haddock biomass from the spring research survey was low from 1972 to 1982. It peaked in 1985 due to the presence of the relatively strong 1981 year class but declined to low levels in subsequent years. **The 1998 survey results indicated some increase but biomass was still low compared to the mid to late 1980's.** In 1999, the biomass index declined. However, the survey did encounter relatively large numbers of what appears to be the 1998 year-class.

Subarea 2 + Division 3K Redfish

There has not been constant directed effort on this stock since 1990 when 2,400 metric tonnes were landed. **Landings** declined to 280 metric tonnes in 1991 and have been 15 metric tonnes or less in each year from 1992 through 1998. Estimates of discarded redfish, taken as by-catch in shrimp fisheries, declined from 386 metric tonnes in 1992 to 110 metric tonnes in 1994. Estimates from the 1995-97 shrimp fisheries have not been compiled to date. However a preliminary estimate for1998 indicates that about 120 t of redfish were discarded in that year, similar to 1992.

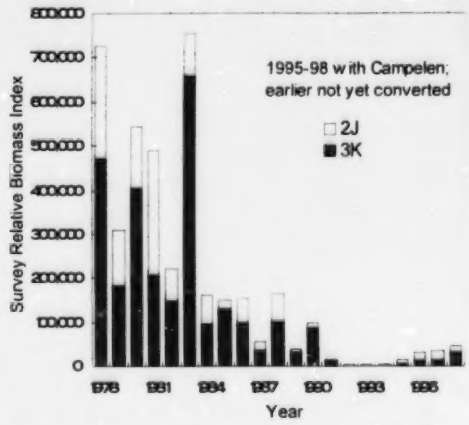


Figure 5 – Fall research survey biomass index for Subarea 2 + Division 3K redfish 1978-1998.

Results from **research vessel surveys** in Div. 2J and 3K suggest the resource was at an historically low level in 1994. The 1995-98 survey estimates cannot at this time be compared directly with the historical series because data conversion is not yet complete. Although the Campelen trawl has resulted in a higher catchability, the survey biomass estimates for 1995-98 are still very low; between 4 and 13% of the 340,000 t 1978-88 average.

This **stock remains at a low level.** Recruitment has been very poor since the year classes of the early 1970's. However, there is a pulse of recruitment (3 year olds average 9-10 cm) detected in the recent surveys. Further monitoring is required to determine the relative strength of the pulse. **Aside from this, there are no indications that the status of the stock will change in a positive way in the foreseeable future.**

Subarea 2 + Division 3K American Plaice

A TAC of 100 metric tonnes, in place since 1995 was reduced to 0 in 1998. Catch from this stock was only about 6 metric tonnes in 1998, the fourth consecutive year in which the catch has been less than 25 metric tonnes.

Research vessel surveys continue to show that the stock is at a very low level. In Div. 2J and 3K combined, the **biomass index** declined by over 95% between 1982-83 and 1992-94.

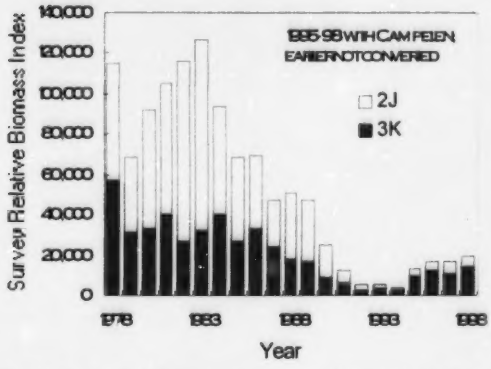


Figure 6 – Fall research survey biomass index for 2+3K American plaice, 1978-1998.

The 1995 to 1998 surveys were conducted with the new Campelen trawl gear, known to have a much higher catchability of small American plaice. Therefore the survey biomass indices in Div. 2J and Div. 3K for 1995 to 1998 are not directly comparable with previous values. However, even with this change in survey gear, the divisions 2J3K biomass index in the most recent 4 years is only about 10 - 15% of the peak values seen in 1982-83. There is no trend in the biomass estimates from 1995 to 1998.

Surveys in Div. 2GH in 1996-98 indicate very low biomass of American plaice in these areas, at less than 10% of the level in Div. 2J3K combined.

Given the current stock size estimates from the surveys, there continues to be no optimism about recovery of this stock in the short or medium term.

Thorny Skate in Divisions 3L, 3N, 3O and Subdivision 3Ps

The Canadian skate fishery is regulated through quota control but the non-Canadian fishery outside 200 miles is unregulated. The NAFO Scientific Council has expressed concerns about this unregulated fishery.

Until 1985, reported catches averaged less than 3,000 t. Catches of skate increased dramatically in the early 1990's as a result of increased non-Canadian effort outside of the 200 mile limit. Canadian catches increased in the mid- 1990's. Total catch in 1998 was 10,038 metric tonnes, slightly lower than the 11,928 metric tonnes taken in 1997.

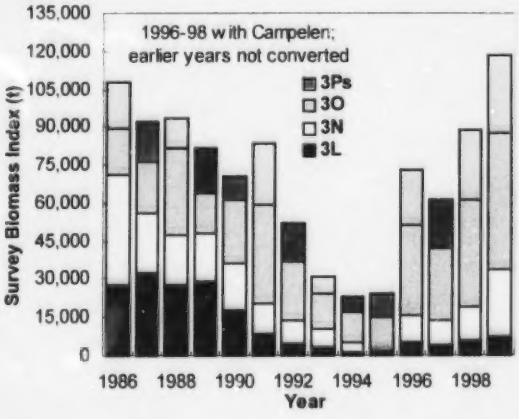


Figure 7 – Spring research survey biomass index for Thorny Skate, 1986-1999.from amounts taken in the late 1980's and early 1990's.

Following a decline starting on the 1970's, biomass of thorny skate in Newfoundland reached its lowest historical level in the early 1990's. The decline was greater to the north. Average size of skates also declined over time and has remained low. The relative roles of fishing and environment in that decline are unclear. However, in the three years since 1997, the spring biomass index has almost doubled. A longer time series is required to determine if the trend

over the past 3 years reflects an actual increase in biomass.

Analyses of spring and fall surveys and fishery data suggested that skate perform an annual migration toward the shelf edge in winter returning onto the shelf in mid-summer. These movements out of the research survey area affect spring estimates of biomass that are 40% lower than those from the fall surveys (1996-1998).

There is a lack of information on stock and age structure, growth rates and age at maturity of skate in the waters around Newfoundland. Also, what proportion of the decline of this resource is attributable to changes in fishing mortality vs. environmental influences is unclear. **An increase in the biomass index over the past three years suggests that the period of decline starting in the 1970's has come to an end.**

White Hake in Divisions 3L, 3N, 3O and Subdivision 3Ps

The fishery for white hake on the Grand Banks is **not regulated by quota**. At present, closures due to high bycatch are the only limit on directed effort for hake. If this constraint was removed, catches could increase, possibly to the detriment of the stock.

Landings occur both as bycatch and from a directed fishery. Reported catches, mainly from 3Ps and 3O, have declined during the last two decades to less than 1,000 t annually since 1994. The catch in 1998 was only 626 metric tonnes. Non-Canadian catches have not been reported to NAFO since 1991.

Starting in the 1970's, **biomass** of white hake in 3LNOPs gradually declined to its lowest historical level in the early 1990's and has fluctuated at low levels since. During the decline, white hake maintained the same geographical range along the south-western slope of the Grand Banks and Laurentian Channel.

What proportion of the decline of this stock is attributable to changes in fishing mortality vs. environmental influences is unclear.

However, in 1999, the spring biomass index was three times the previous year, primarily due to the 3O index. Whether this represents a large increase in biomass for this stock is uncertain. A longer time series of Campelen data is required.

The pelagic juvenile survey, conducted annually since 1992, found a large increase in young of the year white hake in 1996. Subsequently, an increase in proportion of 25 cm mode fish was noted in 1997, the best sign of small fish in recent years.

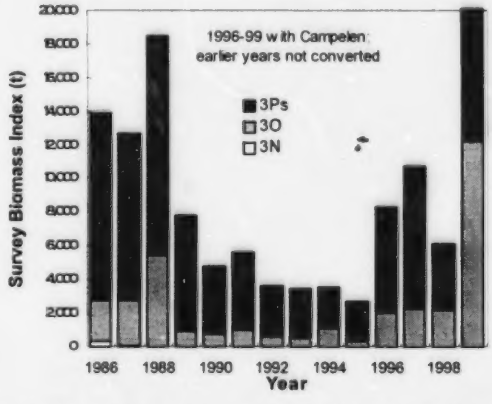


Figure 8 – Spring research survey biomass index for White Hake 1986-1999.

Average size of hakes declined dramatically during the 1980's and has remained low since.

Information on stock and age structure of the population, growth rates and age at maturity of white hake in the waters around Newfoundland is lacking. **Indications of recruitment in 1996 and an increase in the biomass index in 1999 may be positive signs. Further monitoring is required.**

Monkfish in Divisions 3L, 3N, 3O and Subdivision 3Ps

A directed trawl fishery for monkfish began in 1991, and almost 400 metric tonnes were taken that year. Catches gradually increased with the development of this fishery, to about 800 metric tonnes in 1994, but the catches fell to between 170 and 560 metric tonnes in subsequent years. The 1998 catch was 437 metric tonnes.

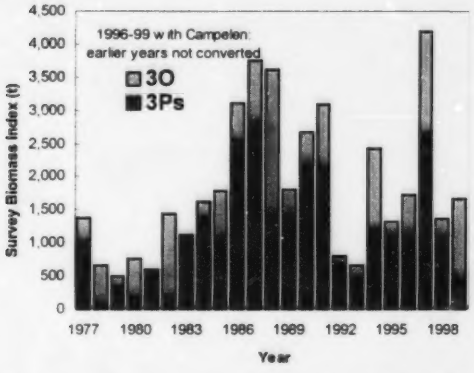


Figure 9 – Spring research survey biomass index for Monkfish 1977-1998.

The **survey biomass index** peaked in 1987, then declined since the mid-1980's and has fluctuated since the change to Campelen gear in 1996. **Assuming catchability is greater with the Campelen, this resource appears to remain at a low level compared to the mid-1980's.**

Catfish (Wolffish) in Divisions 2J, 3K, 3L, 3N, 3O and Subdivision 3Ps

Catfish is reported in the landing statistics as a single species but comprises 3 species; striped (Atlantic), spotted and northern (broadhead), the first two of commercial value. Northern or broadhead catfish is not of commercial value and is discarded. There is no directed fishery for any of the species. **Rather, they have been taken in substantial numbers as by-catch in other fisheries.**

During the 1980's, **catches** exceeded 1,000 metric tonnes in most years then declined after 1991 when many groundfish fisheries were closed. Reported Canadian landings were only 23 metric tonnes in 1996, but increased to 157 metric tonnes in 1997 and 155 metric tonnes in 1998.

For **spotted catfish**, the **research survey biomass index** has fluctuated at a low level since the early 1990's, well below the values observed in the early 1980's.

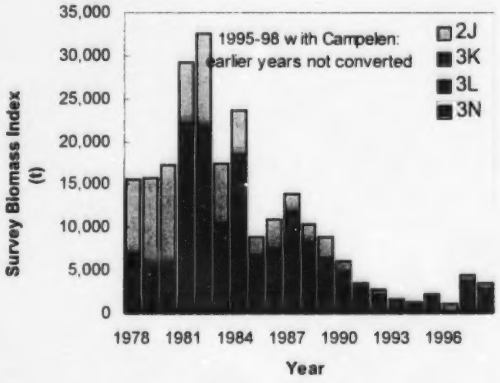


Figure 10 – Research survey biomass index for Spotter Catfish 1978-1998.

For **striped catfish**, the **survey biomass index** also remains at a relatively low level, although the overall decline has not been as great as occurred with spotted catfish.

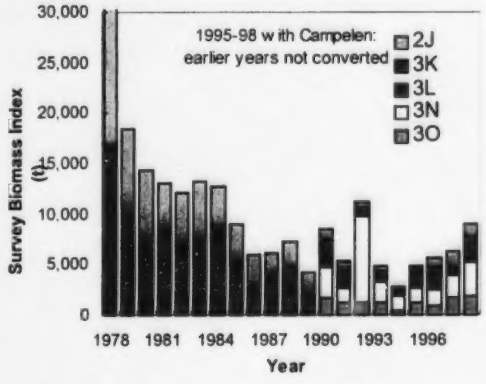


Figure 11 – Research survey biomass index for Striped Catfish 1978-1998

Biomass index of spotted and striped catfish remain at low levels. However, the index for striped catfish has increased over the past five years perhaps suggesting some moderate recovery. Exploitation on both of these species remains low.

Lumpfish in Divisions 3K, 3L and 3P

Lumpfish roe **landings** from divisions 3K, 3L and 3P were approximately 500 metric tonnes from 1977 to 1984. They reached a high of 3,000 metric tonnes in 1987 then declined to an average of 2,000 metric tonnes from 1988 to 1994. There was a decline to 1,000 metric tonnes in 1995 and 1996. The landings increased to 2,000 metric tonnes with 3Ps at an all time high of 1,600 metric tonnes in 1997. Landings fell to 1,100 metric tonnes in 1998.

The lumpfish fishery is exclusively on pre-spawning mature females and therefore the spawning stock is vulnerable to over-exploitation.

This fishery is regulated by **effort controls**. There have been reductions in numbers of nets allowed as well as duration of the fishery in recent years These reductions in effort over time were imposed as a result of indications of stock declines, particularly in divisions 3K and 3L.

Research vessel survey results are not useful in evaluating this resource due to the relative inshore distribution compared to survey coverage.

There are **no scientific investigations to determine the current status of this resource**.

Winter (Blackback) Flounder in Divisions 3K, 3L and 3Ps

Catches increased in 1994 and 1995 to 1,564 and 1,054 metric tonnes respectively, but declined again in 1996, 1997 and 1998 to 589, 498 and 504 metric tonnes respectively, similar to levels observed in the late 1980's and early 1990's. It is unknown whether these declines represent a decline in the resource or a decrease in fishing effort.

Blackback flounder is rarely observed in research vessel catches as it is generally restricted to less than 60 m water depth. **Lack of data make it impossible to determine trends in biomass or examine other biological characteristics.** The distribution of reported landings suggest that it is widespread along the coast.

The Environment

Annual mean **air temperatures** over most of the Northwest Atlantic during 1998 increased over 1997 values and were above the long-term mean. Sea ice on the Newfoundland and Labrador Shelves appeared late and left early resulting in a shorter duration and a decrease in the areal extent during 1998 over 1997 values. The number of icebergs reaching the Grand Bank increased over 1997 but remained well below the high numbers of the early 1990s.

Ocean temperature at Station 27, which is located in the inshore branch of the Labrador Current, ranged from 0.3• to 0.5°C above normal for the winter months over most of the water column during 1998. By mid-Summer, temperatures fell below normal by up to 2•C at 30-m depth. These colder than normal temperatures penetrated deeper into the water column reaching 100 m depth by November. Fall temperatures in the upper layer were about normal. Bottom

temperatures throughout the year were above normal by generally near normal throughout the year except for a positive anomaly (up to 0.3) about 0.3°C. **Salinities** at Station 27 were centred at about 50-m depth during fall.

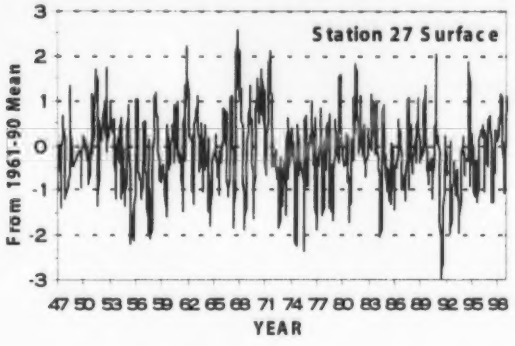


Figure 12 – Surface temperature difference from 1961-1990 mean, 1947-1998.

During the summer of 1998, the total amount of sub-zero °C water (**cold intermediate layer**) on the Newfoundland Shelf continued the below normal trend established in 1995.

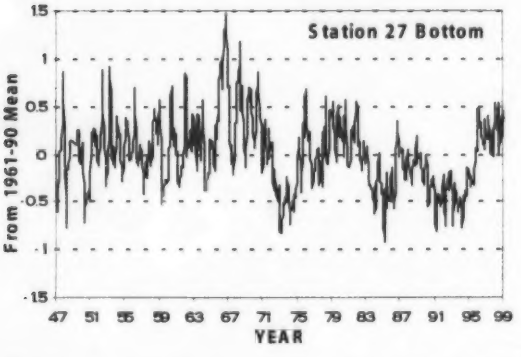


Figure 13 – Bottom temperature difference from 1961-1990 mean, 1947-1998.

Bottom temperatures on the Grand Bank during the spring of 1998 were up to 1•C above the long-term average with a very small area of sub-zero •C water restricted to the deeper portions of the Avalon Channel.

During the fall of 1998, bottom temperatures were above normal over many areas particularly on the offshore portion of the Northeast Newfoundland Shelf. There was a significant decrease in the areal extent of subzero °C bottom water and a corresponding increase of about 70% in the extent of water above 1°C during the spring of 1998 compared to 1997.

During April of 1998 bottom temperatures were about average over Burgeo Bank and Hermitage Channel and appear to have moderated to near normal values over most of **St. Pierre Bank.** These represent an increase over 1997 values. The areal extent of bottom water with temperatures above 1°C was about 50% of the total area of the banks in the 3Ps region during 1998 the first significant amount since 1984. **In general, temperature conditions in this region are highly variable but it appears that the cold trend on St. Pierre Bank moderated during 1998.**

Outlook

For most groundfish stocks, there are few signs of recovery for stocks examined in this overview. Many of the species are relatively long lived and will require a number of years following the next good recruitment before these year-classes would begin to contribute to the spawning stock biomass.

The exceptions to the above are cod and witch flounder in Subdivision 3Ps and perhaps thorny skate that appear to be stable or increasing somewhat at the current catch levels.

For More Information

Research Documents:

Anon. 1999. Oceanographic Conditions in the Newfoundland Region during 1998. DFO Science Stock Status Report G2-01 (1999).

Colbourne, E. 1999. Oceanographic conditions in NAFO Divisions 2J 3KLMNO during 1998 with comparisons to the long-term (1961-1990) average. DFO Atl. Fish. Res. Doc. 99/48.

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ISSN: 1480-4913

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